

Overview

Monthly rainfall totals were below average compared to their long-term averages for September across the country. Monthly average rivers flows for September at 62% of river flow monitoring stations were in the 'below normal' category. Similarly for lake level monitoring stations, 44% stations recorded levels within the 'normal' range and 42% within the 'below normal' range category for this time of year.

Average groundwater levels fell at 82% of groundwater monitoring stations between August and September 2021 across the country. 41% of groundwater levels recorded were 'below normal' for this time of year, with a further 33% in the 'normal' range and 21% in the 'particularly low' range category. Similarly, spring flows were predominantly within in the 'below normal' and 'particularly low' range for this time of year across the country.

Rainfall

The majority of monthly rainfall totals across the country were below their Long-Term Average (LTA). Percentage of monthly rainfall values ranged from 53% (monthly rainfall total of 37.7 mm) at Dunsany, Co Meath to 133% (the month's highest monthly rainfall total of 147.8 mm) at Knock Airport, Co Mayo. Monthly rainfall totals were lowest at Phoenix Park, Co Dublin with 33.4 mm (56% of its LTA). The highest daily rainfall total was 31.6 mm at Mace Head, Co Galway on Wednesday 8th. The number of rain days ranged from 8 days at Phoenix Park, Co Dublin to 23 days at both Markree, Co Sligo and Valentia Observatory, Co Kerry. The number of wet days ranged from 7 days at Phoenix Park, Co Dublin to 18 days at a few stations in the West. The number of very wet days ranged from zero days at a few stations to 7 days at Newport, Co Mayo. Seven stations had absolute droughts between Sunday 22nd August and Wednesday 8th September. These were Phoenix Park, Co Dublin, Oak Park, Co Carlow (lasting 17 days), Shannon Airport, Co Clare, Johnstown Castle, Co Wexford, Athenry, Co Galway, Valentia Observatory, Co Kerry (lasting 16 days) and Casement Aerodrome, Co Dublin (lasting 15 days). Fourteen stations had dry spells between Saturday 21st August and Wednesday 8th September (lasting between 15 and 18 days).

River Flows

River flows generally fell throughout the country in September and were lower at 95% monitoring stations compared to flows observed in August 2021. The monthly average flows were below the long-term monthly average for September at all main rivers across the country. Analysis of monthly average flows at 159 river monitoring sites across the country identified; 51 (32%) were 'normal', 99 (62%) were 'below normal' and 9 (6%) were classed as 'particularly low' for this time of year.

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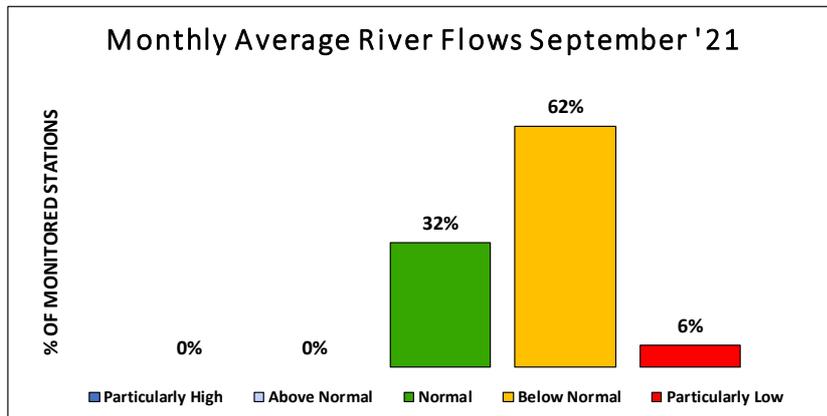


Figure 1: Percentage distribution of river flow monitoring sites within each of the percentile flow categories for September 2021

Lake Levels

Average lake levels were also lower at 76% of monitored lakes compared to levels observed in August. Average lake levels at 43 lakes were classified as ‘particularly high’ at 1 (2%) lake (Emy Lough, Co. Monaghan), ‘above normal’ at 1 (2%) lake (Lough Arrow, Co. Sligo), ‘normal’ at 19 (44%), ‘below normal’ at 18 (42%) and ‘particularly low’ at 4 (9%) lakes for the month of September.

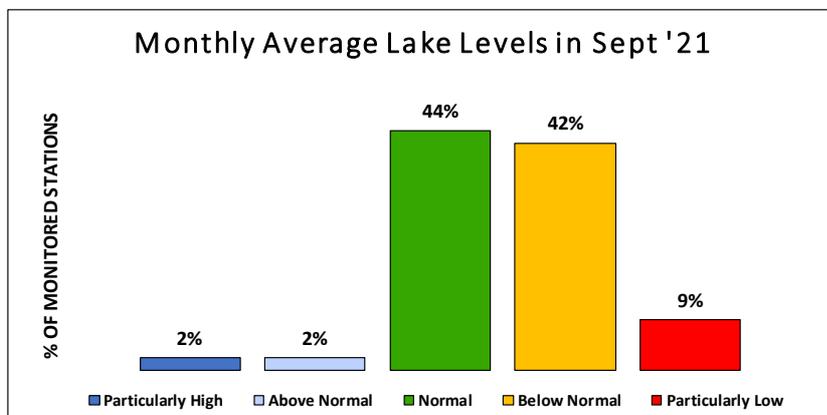


Figure 2: Percentage distribution of lake level monitoring sites within each of the percentile flow categories for September 2021

Groundwater Levels and Spring Flows

Average groundwater levels fell between August and September at 82% monitoring wells analysed. September groundwater levels were classified as ‘above normal’ at 2 (5%), ‘normal’ at 13 (33%), ‘below normal’ at 16 (41%) and ‘particularly low’ at 8 (21%) monitoring wells across the county.

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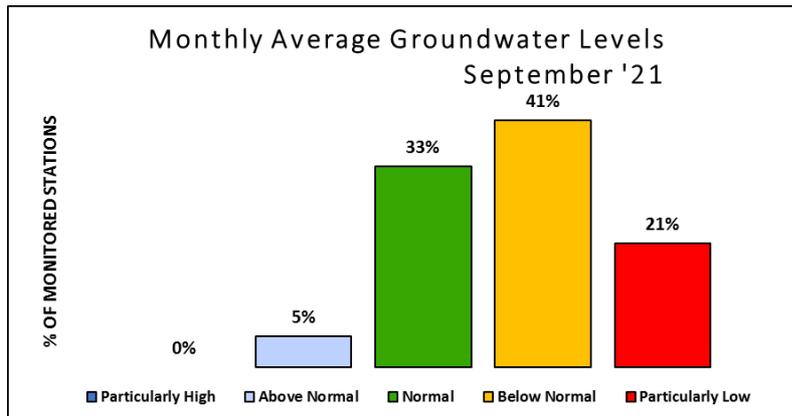


Figure 3: Percentage distribution of groundwater level sites within each of the percentile flow categories for September 2021

Spring outflows were also monitored at 9 EPA monitoring sites. The outflows from these springs were compared to previously recorded flows for September, and 2 springs were 'normal', 3 springs were 'below normal' and 4 springs were 'particularly low' for this time of year.

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Rainfall

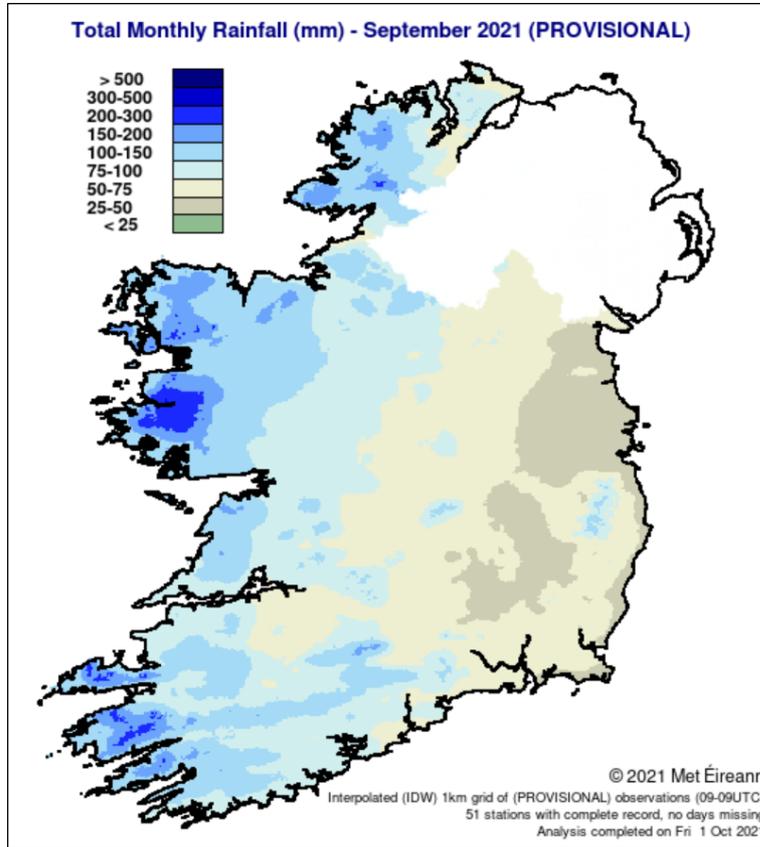


Figure 4: Rainfall map for Ireland September 2021 (Source: Met Eireann.ie)

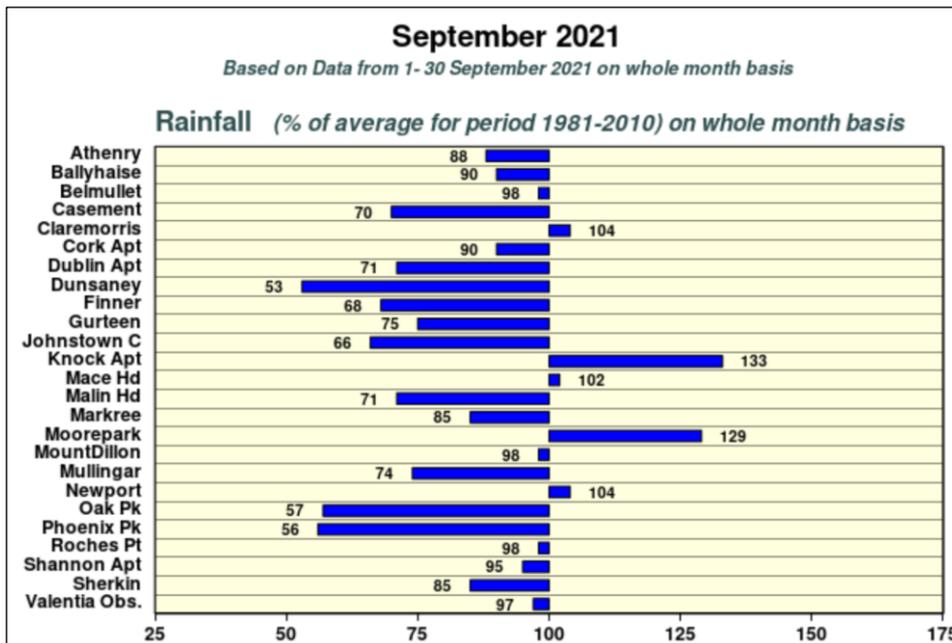


Figure 5: Summary of rainfall at synoptic stations September 2021, figures indicate the percentage difference from the Long-Term Average rainfall for September. (Source: Met Eireann.ie)

River Flows

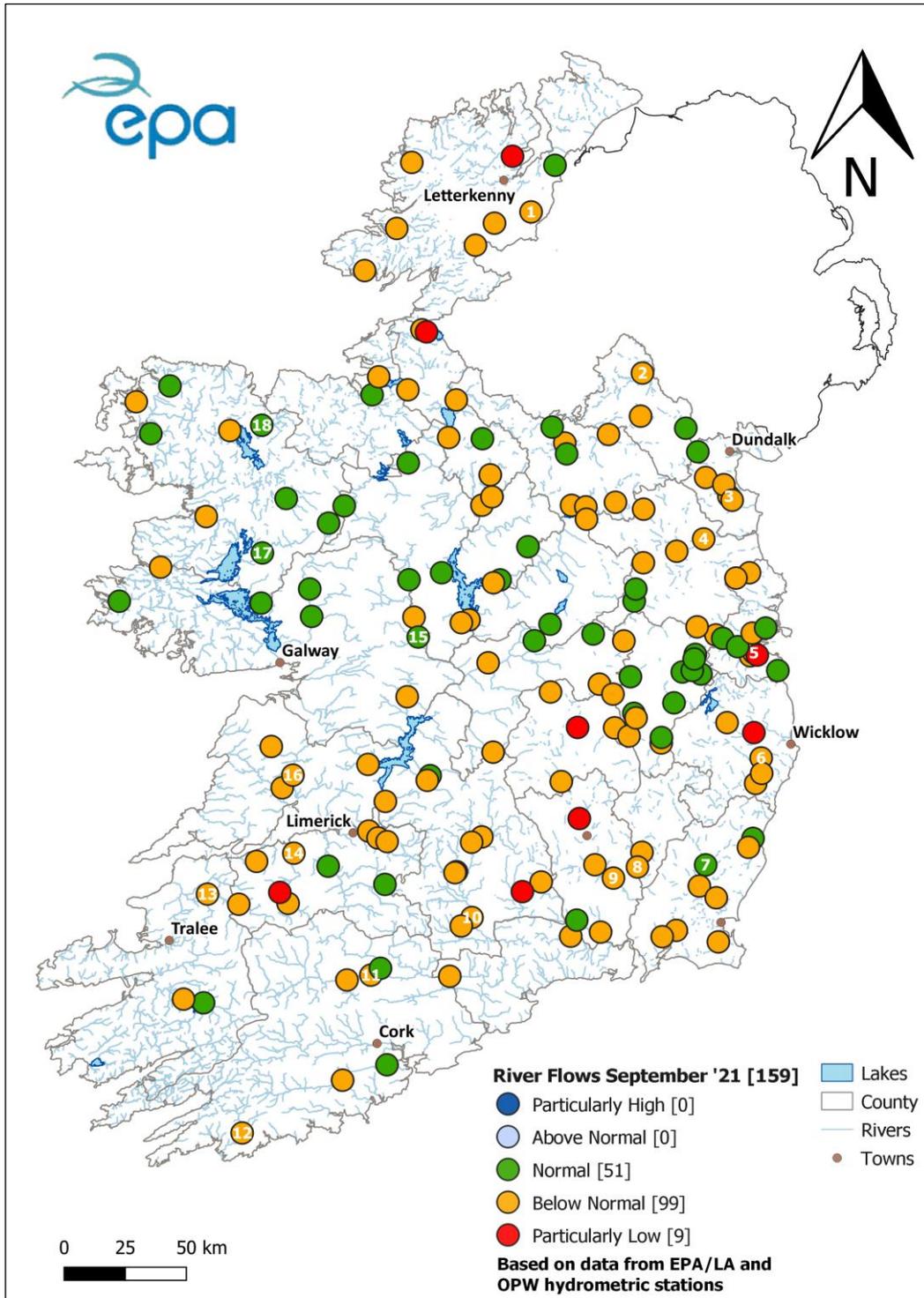


Figure 6: Monthly average river flows for September 2021 relative to historic monthly average flows expressed as percentile of the long-term values of monthly flow. Numbered sites are represented in the hydrographs below. All data are provisional and may be subject to revision. (Source: EPA, OPW).

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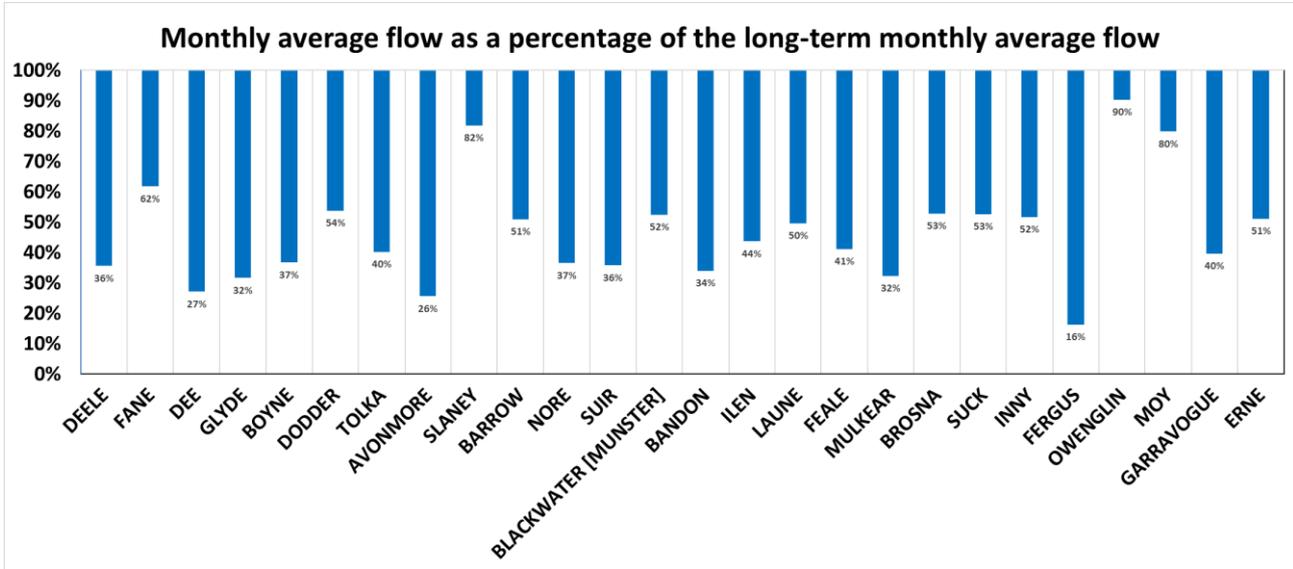
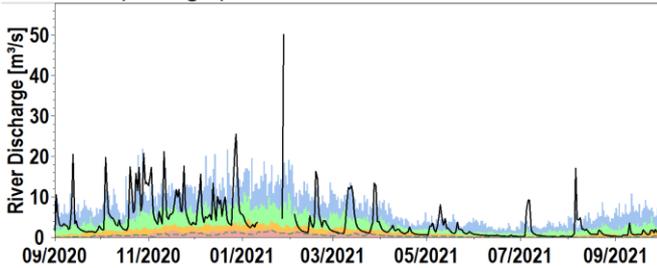


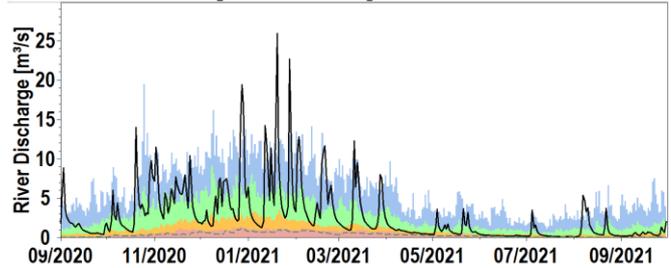
Figure 7: September 2021 average flows as a percentage of the long-term monthly average flow for September at a selected number of stations. All data are provisional and may be subject to revision. (Source: EPA, OPW)

Flow Hydrographs for selected Rivers

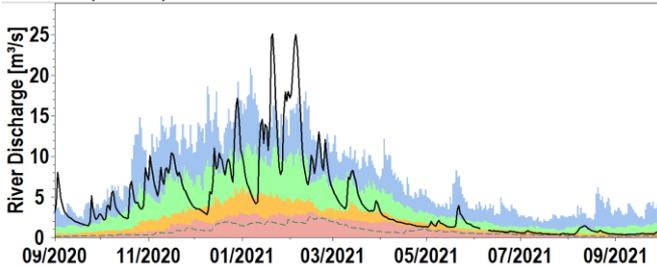
1. DEELE (Donegal)



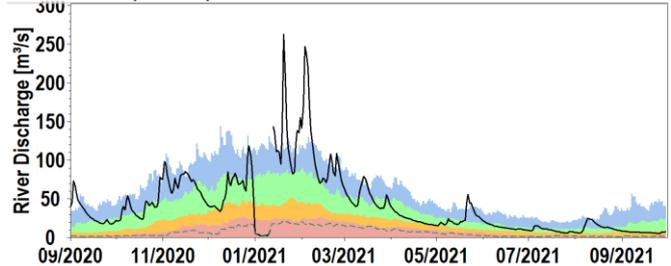
2. BLACKWATER [MONAGHAN]



3. DEE (Louth)

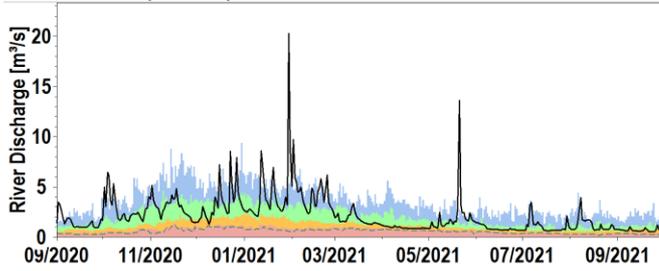


4. BOYNE (Meath)

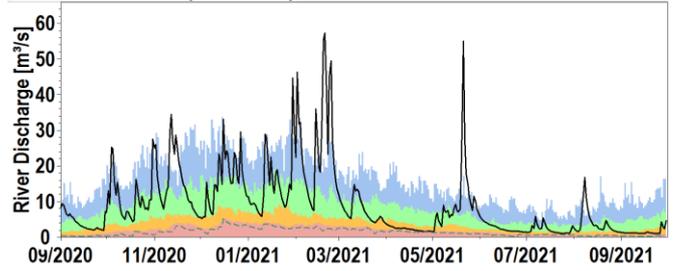


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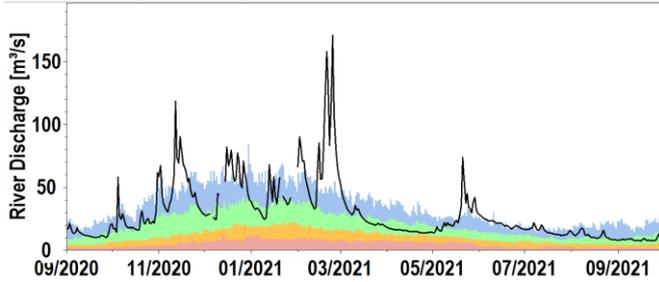
5. DODDER (Dublin)



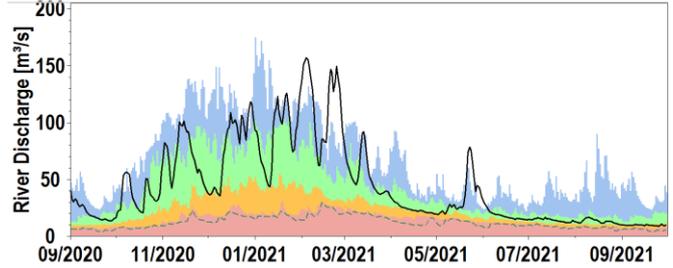
6. AVONMORE (Wicklow)



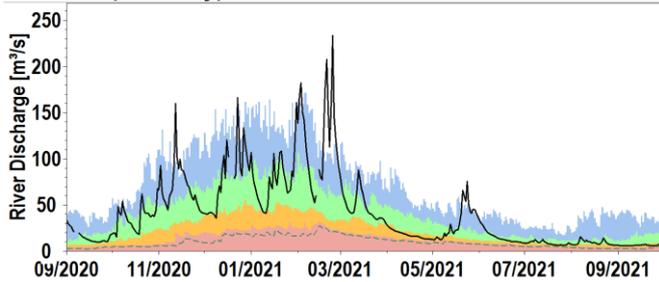
7. SLANEY (Wexford)



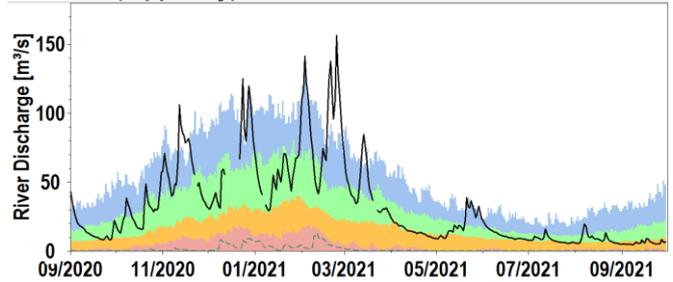
8. BARROW (Carlow)



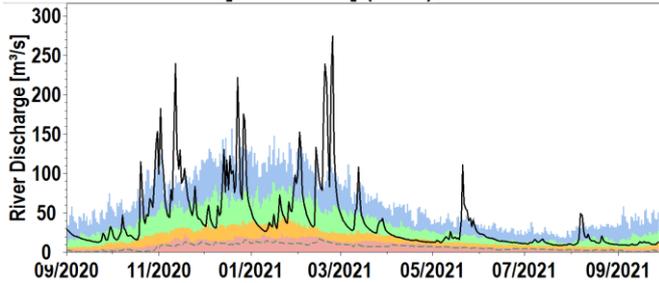
9. NORE (Kilkenny)



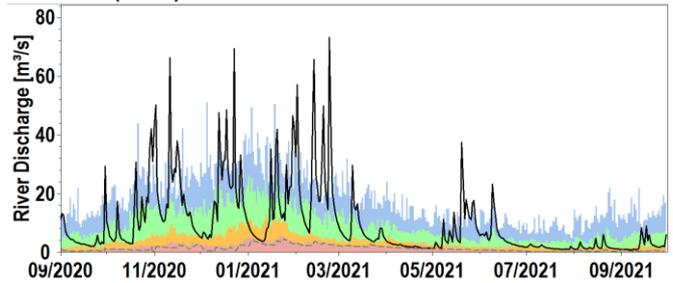
10. SUIR (Tipperary)



11. BLACKWATER [MUNSTER] (Cork)

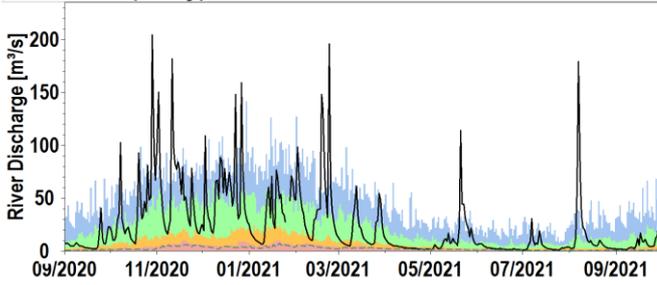


12. ILEN (Cork)

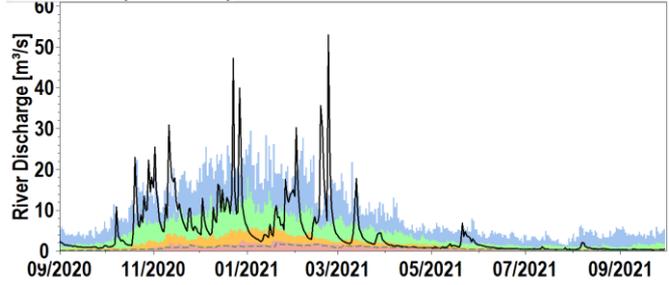


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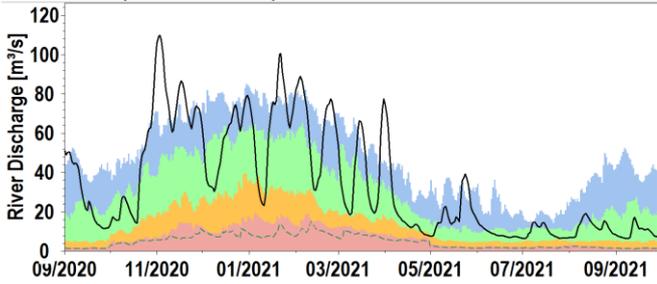
13. FEALE (Kerry)



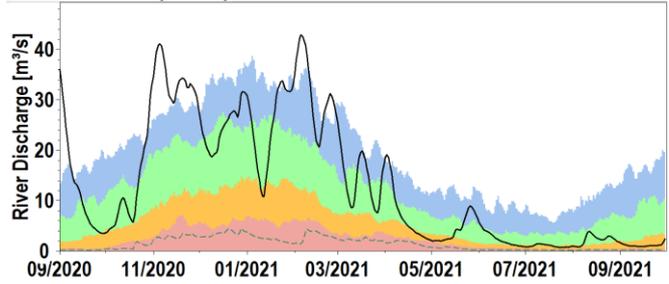
14. DEEL (Limerick)



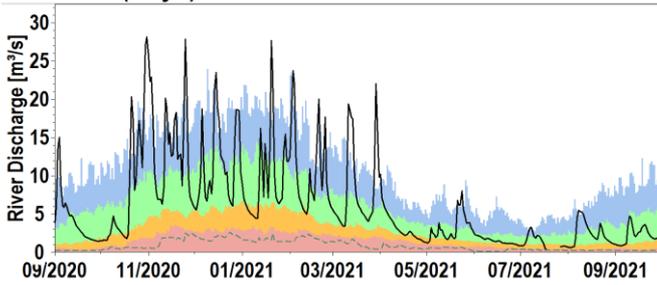
15. SUCK (Roscommon)



16. FERGUS (Clare)



17. ROBE (Mayo)



18. MOY (Mayo)

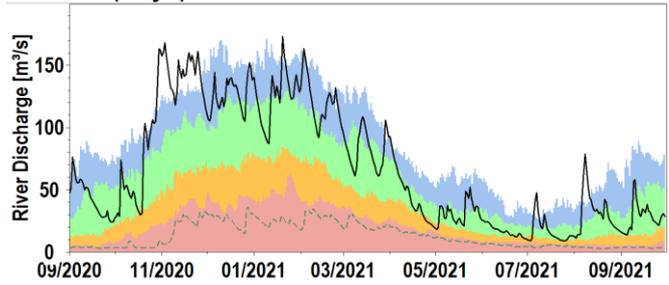


Figure 8: Daily average river flows up to September 2021 relative to historic daily average flows expressed as percentile of the long-term values of each day. All data are provisional and may be subject to revision. (Source: EPA, OPW)

| Explanation - Classes | | | | | | |
|-----------------------------|--------------------------------------|---------------------------------------|-------------------------------------|-----------------------------|---|---|
| | | | | |  |  |
| Particularly Low | Below Normal | Normal | Above Normal | Particularly High | Daily Mean Flow | Lowest Daily Mean Flow |
| <95%tile daily average flow | >95%tile <70%tile daily average flow | >70 %tile <30%tile daily average flow | >30%tile 10%tile daily average flow | >10%tile daily average flow | | |

Lake Levels

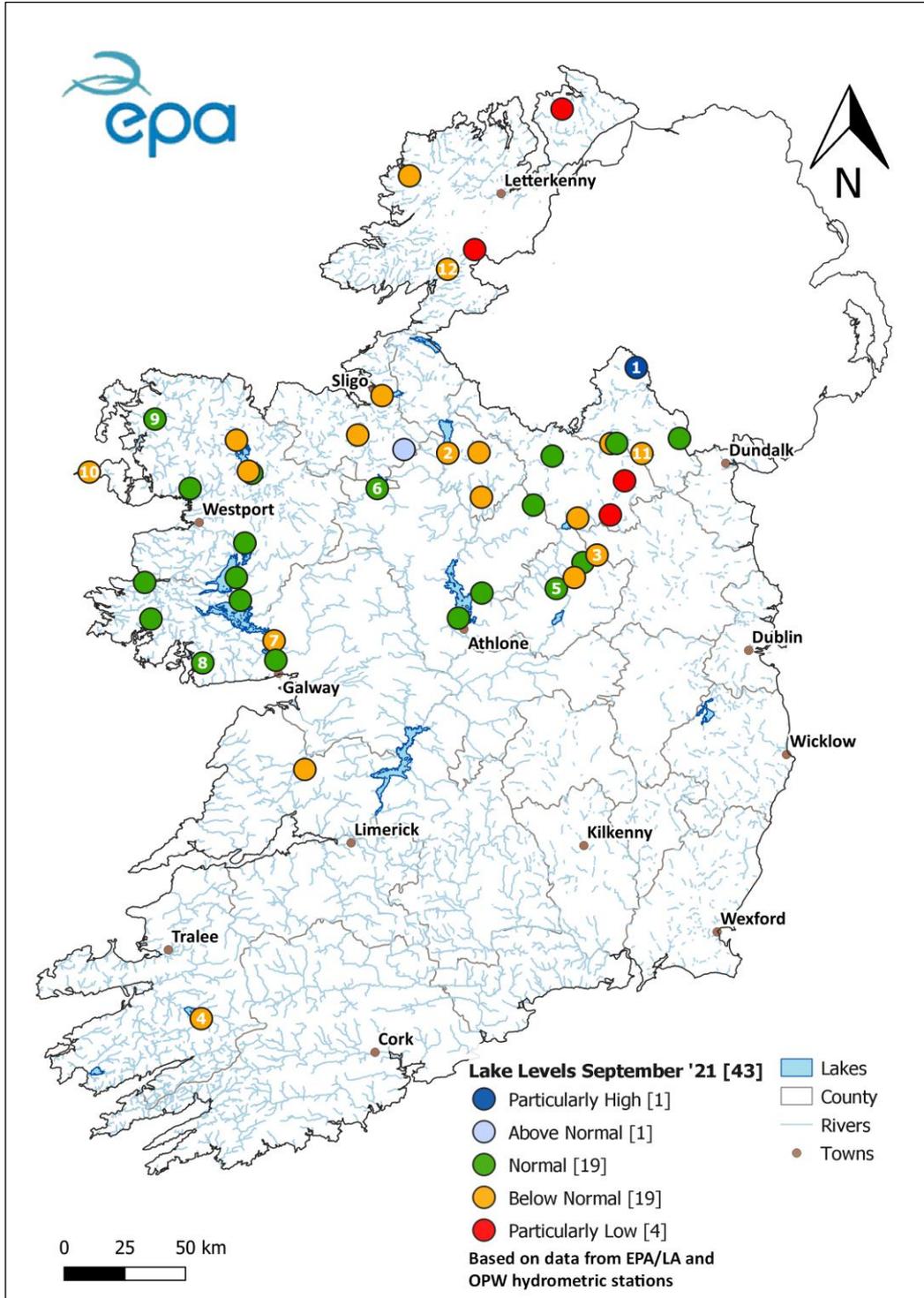
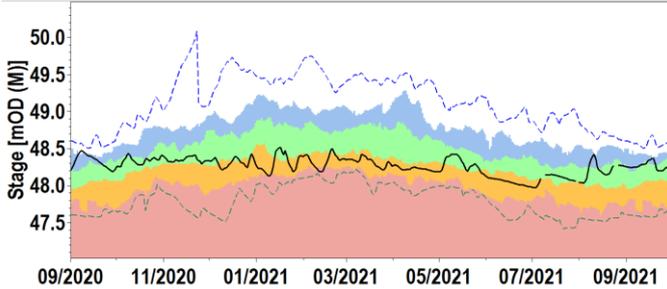


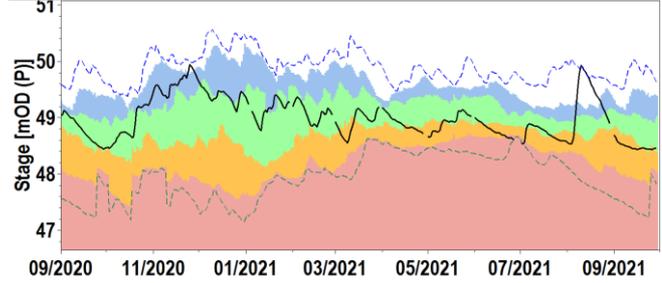
Figure 9: Monthly average lake levels for September 2021 relative to historic monthly average levels expressed as percentile of the long-term values of September. Numbered sites are represented in the hydrographs below. All data are provisional and may be subject to revision. (Source: EPA, OPW)

Water Level Hydrographs for selected Lakes

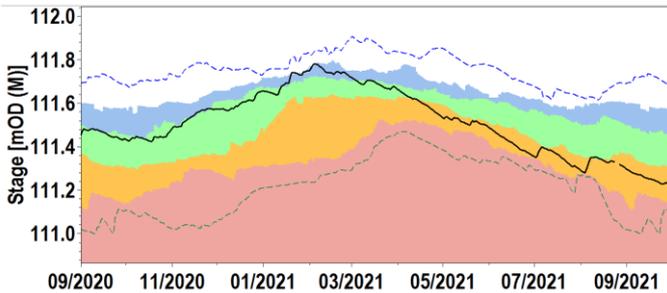
1. EMY LOUGH (Monaghan)



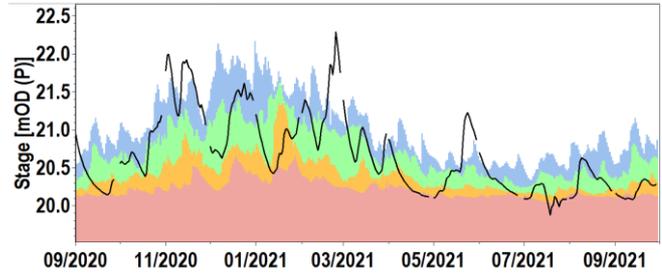
2. L.ALLEN (Leitrim)



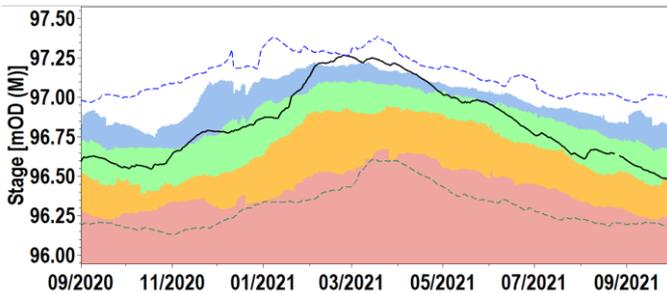
3. L. BANE (Meath)



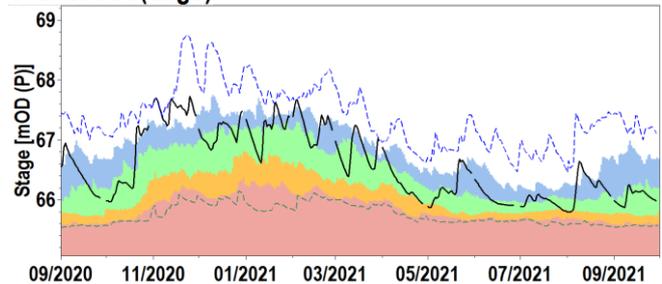
4. L. LEANE (Kerry)



5. L. OWEL (Westmeath)

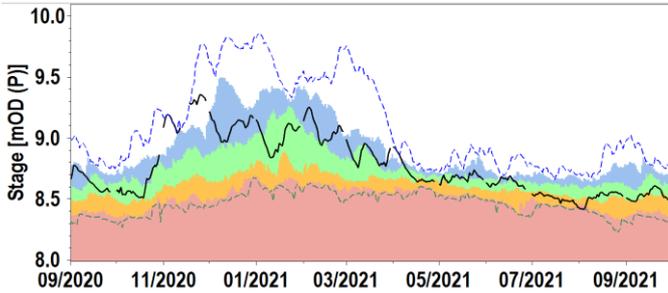


6. L. GARA (Sligo)

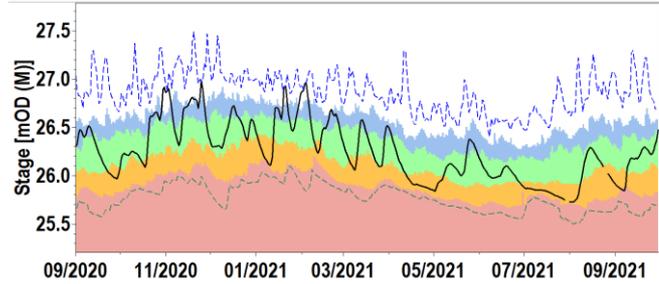


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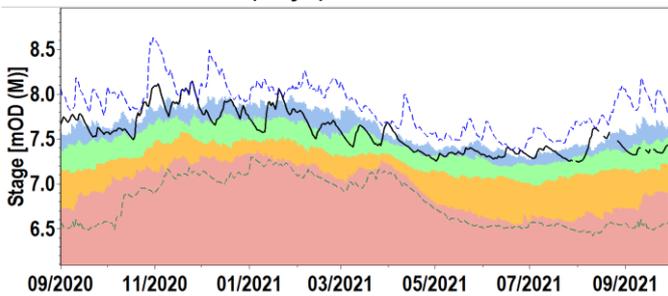
7. L.CORRIB (Galway)



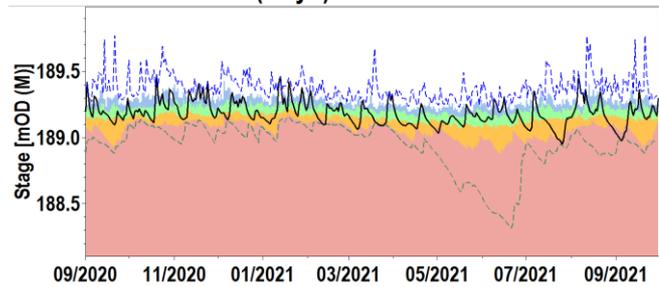
8. GLENICMURRIN LAKE (Galway)



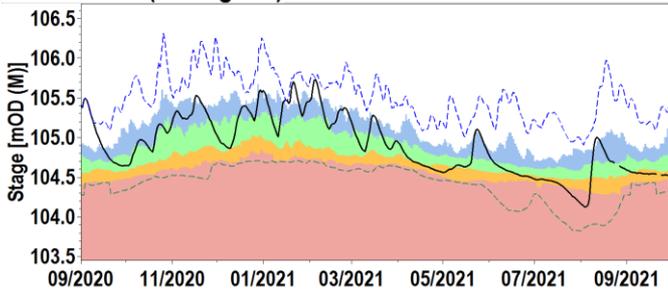
9. CARROWMORE L. (Mayo)



10. L. ACCORMORE (Mayo)



11. L.BAWN (Monaghan)



12. L.ESKE (Donegal)

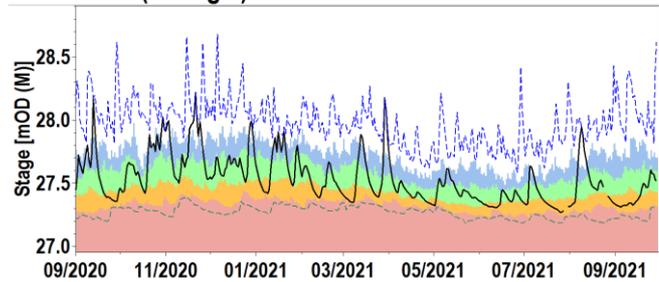
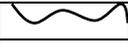


Figure 10: Daily mean lake levels classed relative to historic daily mean levels expressed as percentile of the values of each day with long-term maximum and minimum daily levels. All data are provisional and may be subject to revision. (Source: EPA, OPW)

| Explanation - Classes | | | | | | | |
|------------------------------|---------------------------------------|--|---------------------------------------|------------------------------|---|---|---|
| Particularly Low | Below Normal | Normal | Above Normal | Particularly High | Daily Mean Level mOD | Highest Daily Mean Level mOD | Lowest Daily Mean Level mOD |
| <95%tile daily average level | >95%tile <70%tile daily average level | >70 %tile <30%tile daily average level | >30%tile <10%tile daily average level | >10%tile daily average level |  |  |  |

Groundwater Levels and Spring Flows

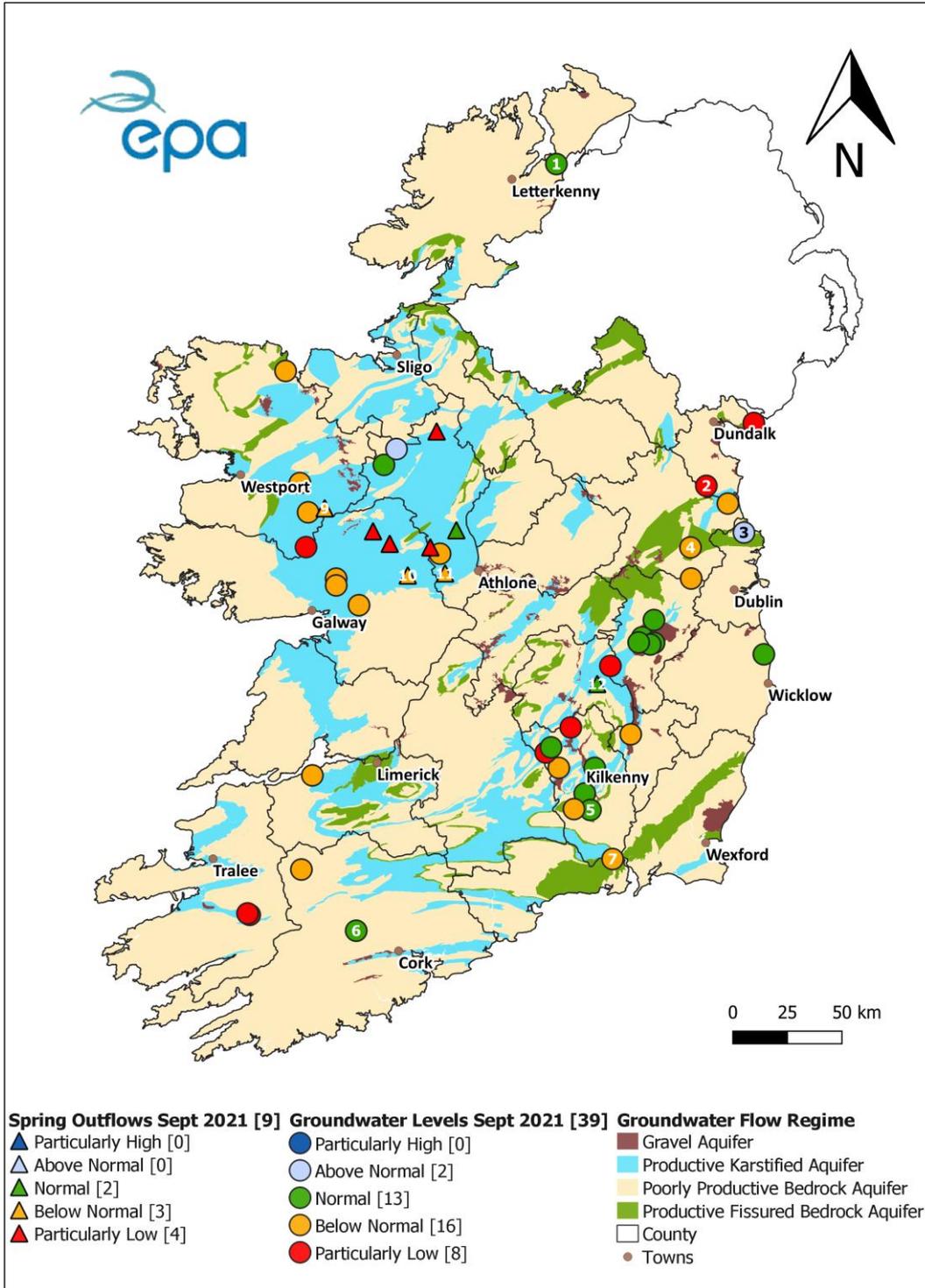
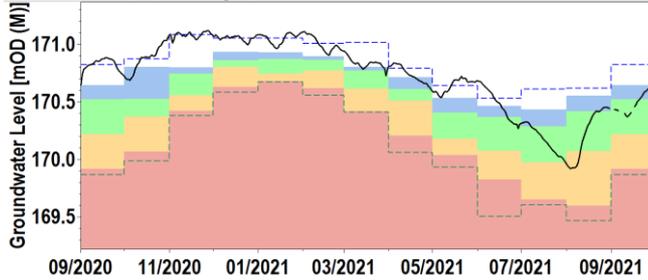


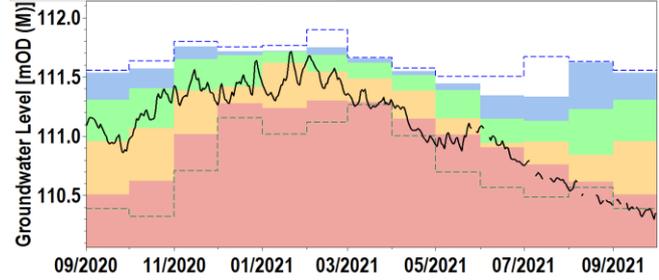
Figure 11: Groundwater level and Spring Flow status for September 2021, relative to historic September groundwater levels. Numbered sites are represented in the hydrographs below. All data are provisional and may be subject to revision. (Source: EPA)

Groundwater and Spring Hydrographs

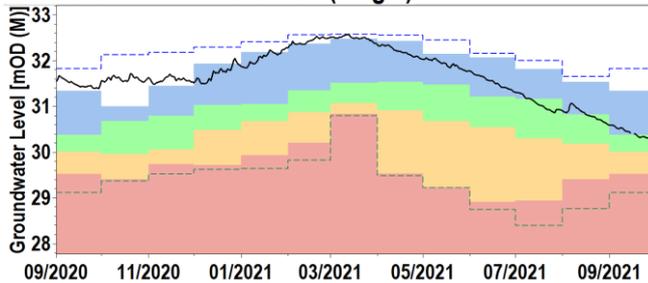
1. GO1 Deep (Donegal)



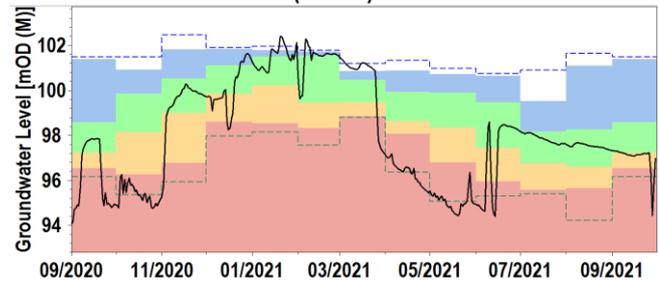
2. Mattock MK1 Deep (Meath)



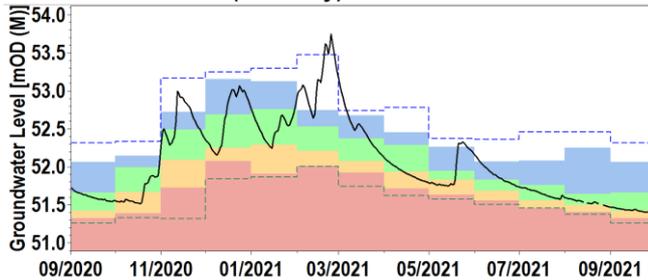
3. BOG OF THE RING OW3D (Fingal)



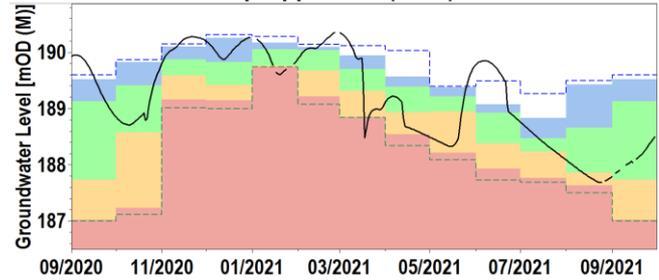
4. DUNSHAUGHLIN PW6 (Meath)



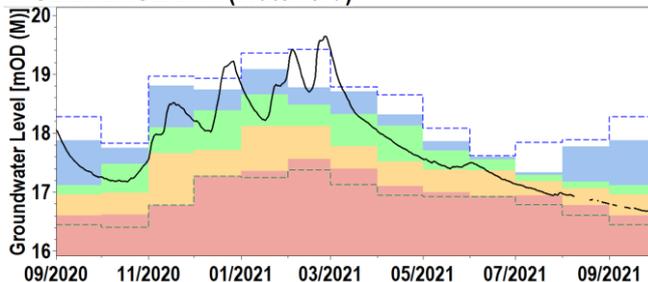
5. KNOCKTOPHER (Kilkenny)



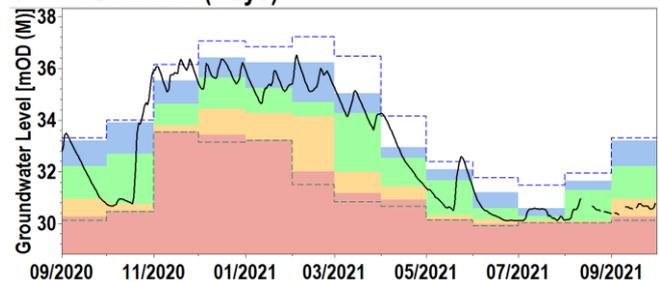
6. DRIPSEY DR1 Deep Upper Site (Cork)



7. SLIEVEROE BH1 (Waterford)

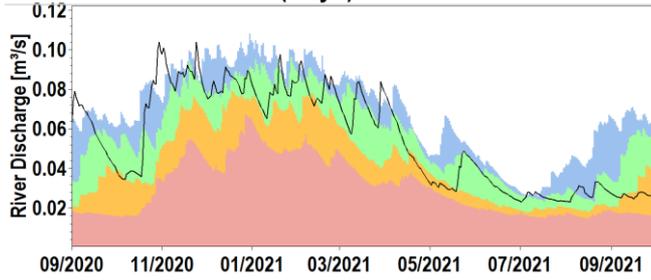


8. MAYO ABBEY (Mayo)

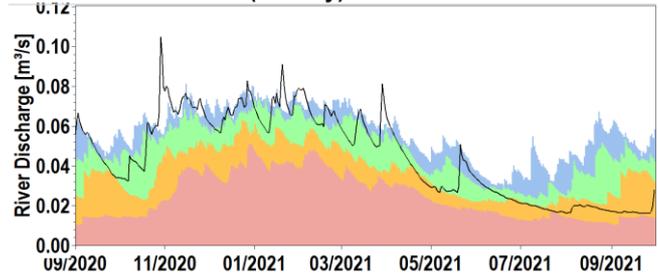


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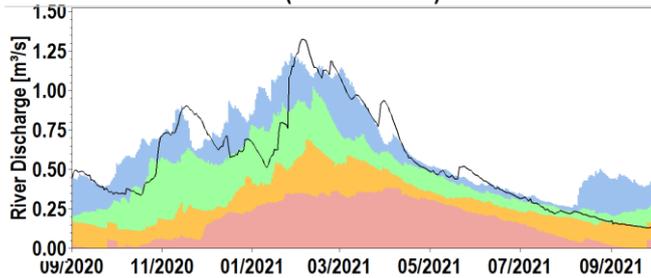
9. BALLINDINE SPRING (Mayo)



10. CALTRA SPRING (Galway)



11. KILLEGLAN SPRING (Roscommon)



12. KYLE SPRING (Laois)

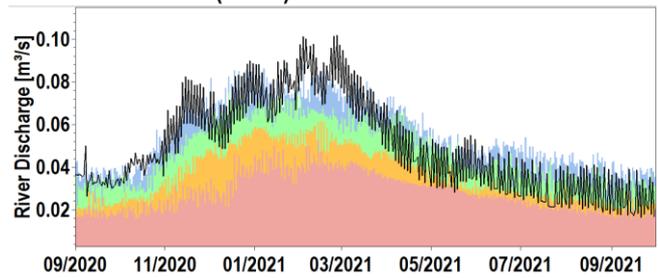


Figure 12: Daily mean groundwater levels (black trace) measured in meters above ordnance datum compared to the 10%tile, 30%tile, 70%tile and 95%tile for each month for the period of record and long-term maximum and minimum levels. All data are provisional and may be subject to revision. (Source: EPA)

| Explanation - Classes | | | | | | | |
|--------------------------------|---|--|---|--------------------------------|--|---|---|
| Particularly Low | Below Normal | Normal | Above Normal | Particularly High |  |  |  |
| <95%tile monthly average level | >95%tile <70%tile monthly average level | >70 %tile <30%tile monthly average level | >30%tile <10%tile monthly average level | >10%tile monthly average level | Daily Mean Level mOD | Highest Month Mean Level mOD | Lowest Month Mean Level mOD |

Glossary of Terms

| | |
|---------------------------|--|
| Aquifer Type | An aquifer is an underground body of water bearing rock or unconsolidated materials (gravel or sand) from which groundwater can be extracted in useful amounts. For the purposes of this report they have been grouped into four aquifer categories as follows: <ul style="list-style-type: none"> ➤ Karstic (Rk and Lk) aquifers; ➤ Gravel (Rg and Lg) aquifers; ➤ Productive fractured bedrock (Rf and Lm) aquifers; ➤ Poorly productive bedrock (LI, PI and Pu) aquifers. |
| Dry spell | A dry spell is a period of 15 or more consecutive days to none of which is credited 1.0 mm or more of precipitation (i.e. daily tot < 1.0 mm). |
| Long term average (LTA) | The arithmetic mean calculated from historic record. For rainfall, the period 1981 to 2010 is used. For other parameters, such as groundwater levels, lake levels and river flow the period may vary according to data availability. |
| mOD | Groundwater levels or lake levels above ordnance datum. In most cases this is relative to mean sea level at Malin but in some cases is relative to Poolbeg. |
| Long-term monthly average | The arithmetic mean calculated from historic record of all monthly averages. |
| Percentile Level/Flow | Level or flow that is equalled or exceeded the stated percent of the time, e.g. 30%tile is the level or flow that is equalled or exceeded 30 percent of the time. |
| Very Wet Days | A very wet day is a day with 10.0 mm or more of rainfall. |
| Wet Days | A wet day is a day with 1.0 mm or more of rainfall. |
| Dry Spell | A dry spell is a period of 15 or more consecutive days to none of which is credited 1.0mm or more of precipitation (i.e. daily tot < 1.0 mm). |
| Absolute Drought | An absolute drought is a period of 15 or more consecutive days to none of which is credited 0.2 mm or more of precipitation. |

Description of flow and level percentile classifications

| | | |
|-------------------|------------------------------|--|
| Particularly High | >10%tile exceedance | Monthly level or flow that can occur 10% of the time |
| Above Normal | >30%tile <10%tile exceedance | Monthly level or flow that can occur 20% of the time |
| Normal | >70%tile <30%tile exceedance | Monthly level or flow that can occur 40% of the time |
| Below Normal | >95%tile <70%tile exceedance | Monthly level or flow that can occur 20% of the time |
| Particularly Low | <95%tile exceedance | Monthly level or flow that can occur 5% of the time |

Useful Links

Access to EPA/LA Hydrometric data on [HydroNet](#)

Access to provisional water level only data from OPW hydrometric stations on [waterLevel.ie](#)

Access to archived water level and flow data from OPW hydrometric stations on [HydroData](#)

Access to turlough and borehole level data from GSI hydrometric stations on [gwlevel.ie](#)

Access to this month's Met Éireann and historic [weather statements](#).